WM
600 New Ludlow Rd,
South Hadley, MA 01075

July 26, 2024

Mr. Parag Amin, Project Manager
Remedial Bureau C
Division of Environmental Remediation
New York State Dept. of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7014

RE: Response to Request for Additional Sampling
Former Gaess Environmental – S.C.A Site, 336018
River Road, Harriman
Town of Monroe, Orange County

Dear Mr. Amin:
Per the letter dated April 30, 2024 for NYS DEC, the May 13, 2024 and June 26, 2024 response by CWM Chemical Services, LLC (CWM), CWM is submitting the attached the draft Work Plan to perform additional sampling for PFAS at the former Gaess Environmental (the Site) location. Please note, we currently do not have a sample date as we continue to obtain access agreements with both the Village of Harriman and the current property owner at the Site, Norfolk Southern. We will update NYS DEC in sixty days as to the status of the agreements. Should you have any questions or wish to schedule a meeting to discuss this proposal, please contact me at (413) 427-4432.

Sincerely,

CWM Chemical Services, LLC

E Ryan Donovan

E Ryan Donovan

District Manager

cc: David Moreira, CWM (w/enclosures)
Greg Lesniak, B&L (w/enclosures)

Former Gaess Environmental Site
NYSDEC Site No. 336018

River Road
Harriman, New York

Prepared For

CWM CHEMICAL SERVICES, LLC

600 New Ludlow Road
South Hadley, MA 01075

March 2024
Revised July 2024

Barton&Loguidice

Former Gaess Environmental Site
NYSDEC Site No. 336018

Site Characterization Work Plan

March 2024
Revised July 2024

Prepared For:

CWM Chemical Services, LLC
600 New Ludlow Road
South Hadley, MA 01075

Prepared By:

Barton & Loguidice, Inc.
11 Centre Park
Suite 203
Rochester, NY 14614

I, the undersigned engineer, certify that I am currently a NYS registered professional engineer and that this Site Characterization Work Plan was prepared in accordance with all applicable statutes and regulations, and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



Jeffrey J. Reed, P.E.
NYS PE #083980

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1.0 INTRODUCTION

Barton & Loguidice, Inc. (B&L), on behalf of CWM Chemical Services, LLC. (CWM), have prepared this Site Characterization Work Plan (Work Plan) describing the proposed investigation at the Former Gaess Environmental – S.C.A. Site located at River Road, Harriman, New York (Site) in support of the Additional Evaluation for Presence of PFAS Request made by the New York State Department of Environmental Conservation (NYSDEC) on March 31, 2023 and the responses to the request submitted on May 25, 2023. The NYSDEC disapproved the Work Plan in an April 30, 2024 letter requesting modifications. CWM provided as response letter dated June 26, 2024 addressing the requested modifications.

The Site is a 2.7 acre area in the Village of Harriman, New York (Figure 1). The Site is currently owned by Penn RR Lines LLC, an entity of Norfolk Southern Corporation and is vacant and unused other than for storage of piles of soil, mixed crushed asphalt and soil, and street sweeping wastes. CWM has had no involvement with site activities on the property since the removal of an air stripper from an adjacent Village supply well in 2011. A Village of Harriman recreational park (Mary Harriman Park) adjoins the Site to the north and northeast. The Village of Harriman Department of Public Works maintenance facility and a Village well-field used for drinking water supply wells are located due north of the Former Gaess Operational Area. No surface water bodies are present at the Penn RR Lines LLC property other than a large stormwater open channel approximately 170 feet southwest (upgradient) relative to the Former Gaess Operational Area. The channel is stone lined, and is conveyed underground to a discharge approximately 140 feet north of the Village supply wells. A 10 inch diameter sanitary sewer pipe flows from west to east across the study area, relatively parallel to Meadow Avenue. The sewer pipe conveys sanitary wastes to the Orange County Harriman Wastewater Treatment Plant, north of and adjacent to the study area. The approximate location of these features are depicted on Figure 1. The Site Characterization will gather further information regarding per- and polyfluoroalkyl substances (PFAS) in the vicinity of the Former Gaess Environmental operational area.

It should be noted that CWM is not the owner of the properties and any commitment by CWM to conduct investigations on the properties shall be coordinated with, and agreed to, by the current property owners (Penn RR Lines LLC and the Village of Harriman).

2.0 RECORDS SEARCH

This section summarizes the existing data collected to date at the Site and a concise summary of additional Site information

2.1. Previous Investigations

The remedial history of the site presented in a 1997 Record of Decision is summarized as follows:

A sewage disposal business operated at the site from 1962 to 1972. Gaess Environmental Service and their successor SCA Chemical Services operated a waste handling transfer station at the site from 1972 to 1978. The NYSDEC discovered abandoned wastes in June 1980 and SCA entered into an order-on-consent in April 1981 requiring the remediation of the site. Under supervision of the NYSDEC, wastes including three tanker trailers, a vacuum truck, four 55-gallon drums and suspected contaminated soils were removed from the site during the summer of 1981. In September 1984, a limited hydrogeological investigation was completed under the direction of SCA. The Village of Harriman supply well MH-1 was sampled and found to contain trichloroethylene (TCE) at a concentration exceeding the NYS Drinking Water Standard. The NYSDEC was notified in October 1990 by the Village and in turn contacted CWM who had acquired SCA in 1986. CWM responded by performing a Phase I in March 1991 to determine if the site was the source of the contamination. This investigation was inconclusive.

A Phase II investigation was completed in July 1991. TCE was detected in the soils and groundwater on site. In December 1991, the NYSDEC and CWM entered into an order-on-consent that required CWM to provide treatment for the contaminated Village of Harriman's public water supply well. An air stripper was installed in April 1992. In February 1994, an order-on-consent requiring CWM to perform a Remedial Investigation (RI) and Feasibility Study (FS) was executed.

An RI was performed in 1994-1995 to identify the source of the groundwater contamination and to evaluate potential exposures to human health and the environment. Soil gas and geophysical surveys were performed to characterize the subsurface soils and a variety of environmental media were sampled for laboratory analyses. The RI findings demonstrate that VOCs were detected in three of eleven soil samples at low part per billion concentrations. VOCs were not detected in groundwater samples collected from site monitoring wells.

A FS (dated February 1996) recommended alternative was to continue treating water (via air stripper) in the public water supply well. Subsequent water quality sampling demonstrated decreasing VOC concentration and CWM requested removal of the air stripper. The NYSDEC approved the removal of the air stripper in May 2011.

Emerging contaminant investigations initiated with sampling at the Village of Harriman public water system in March 2017 when the New York State Department of Health (NYSDOH) collected samples to screen for Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as part of the US Environmental Protection Agency's (EPA) Unregulated Contaminant Monitoring Rule. The sampling

results showed total PFOA and PFOS levels in water supply well MH-1A were slightly above the EPA health advisory level (HAL) of 70 parts per trillion (ppt). This sampling is summarized in a report letter from the NYSDOH to the Village of Harriman mayor dated May 17, 2017.

In 2020, the NYSDEC requested that CWM sample groundwater at the Former Gaess Environmental Site for PFAS. In September 2021, B&L representatives performed field activities to evaluate the presence of PFAS at the Site. These activities included repairing monitoring well MW-2, well development of MW-1 and MW-2 and sampling of MW-1 and MW-2. Activities were performed in accordance with a NYSDEC approved "Preliminary Evaluation for Presence of PFAS Work Plan" dated November 5, 2020. The sampling results (report dated November 10, 2021) showed similar PFAS concentrations in both MW-1 (upgradient from Gaess Former Operations Area) and MW-2 (downgradient from Gaess Former Operations Area). These data indicated that PFAS in the groundwater is originating upgradient from the Gaess Former Operations Area.

B&L issued Freedom of Information Law (FOIL) requests to the NYSDEC and NYSDOH on April 25, 2023 requesting specific information on emerging contaminants at associated with the Village of Harriman water supply wells, and Orange County Sewer District Harriman Wastewater Treatment Plant. The NYSDEC fulfilled the FOIL request on June 16, 2023. The NYSDOH fulfilled the FOIL request May 7, 2024. The redacted documents received were generally not pertinent to the investigation associated with the MH-1A supply well.

NYSDEC records indicate that since 2022, groundwater investigations involving the Former Nepera Plant Site have resulted in 7 monitoring wells being installed on the southeast portion of the Village owned Mary Harriman Park and on the eastern half of the Penn RR Lines LLC property. This southeastern portion of the property is located over 300 feet cross-gradient from the Former Gaess Operational Area and is not subject to CWM's investigation. The primary investigation is documented in a Phase II Emerging Contaminants Site Investigation Report (dated September 2022) conducted by ELT Harriman, LLC and Nepera, Inc. & Warner-Lambert Company (Corporate Defendants). Samples for emerging contaminants were collected from several of the new monitoring wells and several pre-existing monitoring wells on the Mary Harriman Park property (installed by the Village of Harriman in 2007 to evaluate elevated sodium and chloride levels at the wellfield). The compound 1,4-dioxane was not detected in groundwater on the Mary Harriman Park property during the 2022 investigations. PFAS were detected at relatively high-levels in multiple wells on the eastern portion of the Mary Harriman Park. The NYSDEC requested that Nepera Corporate Defendants conduct additional sampling at the eastern portion of the Norfolk Southern and Mary Harriman Park Properties in a letter dated June 15, 2023. Reports of further studies have not been provided to CWM by NYSDEC.

2.2. Concise Summary of Site Information

The past environmental studies referenced above provide a contaminant remedial history for the site. Figure 1 presents the relationship between the overall property, owned by Penn RR Lines LLC, the Former Gaess Operational Area, the Village owned DPW facility, Village supply wells and Village park.

PFAS concentrations exceeding drinking water maximum contaminant levels have been identified in Village Supply Well MH-1A and PFAS are the contaminant of concern relative to this site characterization.

3.0 TECHNICAL APPROACH

3.1. Selection of Sampling Location and Analytical Parameters

The goal of the Site Characterization (SC) is to gather the information necessary to characterize whether site-related contamination requires further investigation or remedial action. Sampling and analyses performed to date has shown that contamination by Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) is present at the water supply Well MH-1A. The SC technical approach is focused on determining PFAS concentrations upgradient from the Well MH-1A. Sample collection and analyses for 1,4-dioxane will also be conducted per NYSDEC request. The SC will comprise drilling and sampling to meet the following objectives:

1. Install and develop a replacement monitoring well at the former GEI-3 well location as requested by NYSDEC. The monitoring well identification is PMW-3 and is depicted on Figure 1;
2. Install and develop one well upgradient from the Former Gaess Operational area at the location depicted as PMW-4. This additional upgradient well is further upslope and upgradient from the Former Gaess Operational Area and will also represent groundwater quality as it enters the Penn RR Lines LLC property;
3. Install and develop a monitoring well (PMW-5) southwest of Village monitoring well MHP-MW—3S. A monitoring well in this area was requested by NYSDEC;
4. Install and develop a monitoring well (PMW-6) southwest of PMW-5 to evaluate water quality as it enters the Penn RR Lines LLC property;
5. Sample collection and analyses of groundwater from MW-1, MW-2, PMW-3, PMW-4, PMW-5 and PMW-6; and,
6. Sample collection and analyses of drinking water in Village supply well MH-1A.

Each of these tasks are described briefly below and in more detail in subsequent sections.

Monitoring Well Installation: The 2” diameter Schedule 40 PVC monitoring wells will be drilled and installed to the top of bedrock. Monitoring wells will contain a 5-foot length screen as well as flush mount, or steel stick-up protective casings at the surface, as appropriate. Well construction will meet DER-10 regulations. The locations for these borings were selected to provide a distribution of locations upgradient from the village water supply well MH-1A, and upgradient from the central portion of the Mary Harriman Park.

Groundwater Sampling: Groundwater samples will be collected from the six monitoring wells as well as the public water supply well (MH-1A). Sampling protocols will meet NYSDECs Sampling, Analysis, and Assessment of Per- and Polyfluoralkyl Substances (April 2023). The samples collected will be analyzed for PFAS using EPA Method 1633, reporting 40 compounds. Although EPA Method 1633 is not a drinking water method, the public water supply well MH-1A will be analyzed usingEPA Method 1633 to enable a comparison of detected PFAS in site groundwater monitoring wells. Past PFAS concentrations reported

using drinking water method 537 will be summarized in the SC Report. Samples collected will also be analyzed for 1,4-dioxane using EPA Method 8270E Selected Ion Monitoring (SIM).
A summary of the sampling and analyses is provided in the following table.

Sample	Medium	Analyses
MW-1	Groundwater	PFAS by EPA Method 1633, 1,4 Dioxane by EPA Method 8270E SIM
MW-2	Groundwater	
Proposed MW-3	Groundwater	
Proposed MW-4	Groundwater	
Proposed MW-5	Groundwater	
Proposed MW-6	Groundwater	
MH-1A	Drinking Water	

The following quality control samples will be collected and analyzed using EPA Method 1633 and EPA Method 8270E SIM:

- One groundwater duplicate,
- One groundwater Matrix Spike/Matrix Spike Duplicate (MS/MSD),
- One equipment blank sample,
- One field blank sample.

3.2. Soil and Groundwater Sampling Methodology

3.2.1. Soil Borings

Soil borings will be installed using Geoprobe® direct push methods. The advancement of soil borings will be supervised by a qualified field hydrogeologist. Soils encountered will be field screened with a calibrated photoionization detector (PID). Subsurface soil borings will be prepared to document soil characteristics inclusive of odor, color, texture, density, apparent moisture content, presence or absence of stratification, presence of sedimentary, brittle or secondary structures, and identified according to the Modified Burmister soil classification system and Unified Soil Classification System (USCS) methods. The presence of visible sheens and/or NAPL will be noted if encountered.

Soil borings will be advanced to the top of bedrock, which past data has shown to be approximately 25 feet deep near proposed well PMW-3 and 20 feet deep near proposed well PMW-4.

3.2.2. Monitoring Well Construction

Determination of where to screen each well to collect representative groundwater samples will be based on existing subsurface data and observations made in the field. Consistent with existing monitoring wells, the screens will be set above the top of bedrock surface. Construction of the monitoring wells will include the following:

- Two-inch diameter, Schedule 40 PVC threaded riser pipe and with five-foot length of prepack screens. The pre-packed screen contains 0.01 inch slotted openings.
- Additional backfill materials to be provided for well construction, including: graded siliceous sand of various sizes for construction of the filter pack and "choke" sand around the well screen; pelleted or granular bentonite for construction of the well seal and grout; and Portland cement (with bentonite) for sealing of the annular space above the well seal.
- PMW-3 and PMW-5 are just off a paved parking lot or tennis court and will be finished with steel flushmount manholes.
- PMW-4 and PMW-5 are located in the woods and finished with above-ground steel stick up well protective casings.
- Each well will be equipped with a locking cap and locked with a pad lock.

During construction and installation of the monitoring wells, the field hydrogeologist's responsibilities will include, but are not limited to, the following:

- Direction and observation of the entire well assembly;
- Observation of sand pack, fine sand pack, pelleted or granular bentonite seal and grout backfill placements;
- Observation of the protective monitoring well cover;
- Final confirmation that the monitoring well produces groundwater and is monitorable.

3.2.3. Well Development

After a minimum of 48 hours after well installation, the monitoring wells will be developed using appropriate methods, such as hand-bailing and/or pumping. New, dedicated certified PFAS-free bailers and/or tubing will be used at each well development location. During the well development process, water quality parameters (pH, temperature, specific conductivity, and turbidity) will be recorded. Development will be considered complete once stabilization of the field parameters has been observed and when turbidity is at 50 Nephelometric Turbidity Units (NTU) or less. Development water will be captured in a 55-gallon drum for appropriate disposal.

3.2.4. Groundwater Sampling

Groundwater sampling will be completed at least two weeks after the well installation activities. Purging and sampling will be conducted with a QED Sample Pro Bladder pump with disposable bladders and dedicated HDPE tubing for each well. Sampling will be conducted using EPA Low Flow methodology subject to stabilizing field parameters. Purge and decon water will be captured in a 55-gallon drum for appropriate disposal. SOPs for sampling are presented as appendices to the QAPP located in Appendix A.

Precautionary sampling measures will be adhered to due to the potential presence of PFAS in field sampling equipment, personal protective equipment (PPE), clothing, and many plastics. Field sampling staff will don appropriate cotton clothing and change out nitrile gloves between

each sampling interval. Field sampling equipment and methodology for collection of aqueous PFAS samples need to include special provisions to eliminate the potential for sampling contamination from PFAS containing materials. The presence of PFAS in certain sampling equipment, containers, pumps, and PPE can result in sample contamination (i.e., false positive) if not avoided during sampling.

Village of Harriman personnel will assist B&L in collecting a sample from MH-1A. It will be verified that MH-1A has been pumping for at least 1 hour prior to sample collection. The well's normal water quality sampling spigot will be accessed and purged for a minimum of 5 minutes. PFAS samples will be collected directly into laboratory prepared bottleware. Field parameters will also be collected from the MH-1A sample spigot.

3.3. Location and Elevation Survey

The location of each new monitoring well installed, and Village monitoring wells MHP-MW-3S, MHP-MW-3D, and MHP-MW-4S, will be determined by a New York State-licensed surveyor. Locations will be reported in feet as horizontal coordinates referenced to the New York State plane coordinate system (NAD 1983), accurate to the nearest one-tenth (0.1) feet. Elevations will be reported in feet referenced to the USGS mean sea level datum; ground levels at wellheads will be accurate to at least one-tenth (0.1) feet, and the top rim of the PVC riser and the lid of the protective cover on each monitoring well will be accurate to one-hundredth (0.01) feet. A fixed elevation at MH-1A will be surveyed to determine static and pumping water level elevations.

3.4. Water Level Monitoring

Water levels will be collected from the six Gaess site monitoring wells, three Village monitoring wells and MH-1A. An electronic water level meter will be used to obtain accurate water level measurements to the nearest 0.01 foot. The value will be recorded in a field notebook. The probe will be raised to the surface and together with the amount of cable that was wetted in the well, will be decontaminated with an Alconox scrub followed by a distilled water rinse. Water levels from MH-1A will be provided by Village of Harriman personnel, either from manually collected levels or from an operating SCADA sensor.

3.5. Sample Analyses & Data Validation

Groundwater samples will be submitted to a selected analytical laboratory approved by the NYSDOH, per its Environmental Laboratory Approval Program (ELAP), for the analyses of PFAS using EPA Method 1633, and 1,4-dioxane using EPA Method 8270E SIM.

A Quality Assurance Project Plan (QAPP) is presented in Appendix A. The purpose of the QAPP is to describe the project-specific quality assurance/quality control procedures that will be observed during this work.

In accordance with DER-10, the selected laboratory will be responsible for providing full Category B deliverables electronically. Data will be validated by a third-party validator, and a Data Usability Summary Report will be generated by the third-party data validator.

3.6. PFAS Source Evaluation

EPA Method 1633 reports 40 substances. Detections from the monitoring wells and MH-1A will be presented in tabular form, in radar plots and/or diagnostic ratios to compare substance type, occurrence, and relative ratios. These techniques are referenced in Interstate Technology Regulatory Council (ITRC) PFAS website as useful source evaluation tools.

3.7. Site Characterization Report

A Site Characterization report will be prepared and will follow the requirements of NYSDEC DER-10. A summary of the investigations performed, results of the data gathered, including a comparison to PFAS and 1,4-dioxane groundwater guidance values. The presentation of the hydrogeologic information derived from this investigation will include a groundwater potentiometric map showing shallow groundwater flow at the Former Gaess Operational area. Figures depicting the distribution of PFAS concentrations will be developed. Data collected during this work will be submitted to NYSDEC's EQuIS database.

3.8. Health and Safety

All work will be performed in accordance with the Health and Safety Plan presented in Appendix B. The proposed work includes intrusive activities and a Community Air Monitoring Program (CAMP) will be implemented. Because VOCs are not a contaminant of concern at this site, the CAMP will monitor only particulates.

4.0 SCHEDULE

The proposed schedule for completion of this Site Characterization Work Plan is presented in Figure 2. The presented schedule is only an estimate and may be altered to accommodate legal access to private property, review times, and field conditions, etc.

MONITORING WELL LOCATION MAP

CMM CHEMICAL SERVICES, LLC
GAESS/HARRIMAN WORK PLAN
VILLAGE OF HARRIMAN
ORANGE COUNTY, NEW YORK

N
TRUE NORTH

VILLAGE DPW MAINTENANCE BUILDINGS
RIVER ROAD
STREET SWEEPER CLEANING STATION (BY OTHERS)
RAMAPO RIVER
MEADOW AVENUE
VILLAGE WATER SUPPLY WELL MH-1A
MW-2
GEI-3 (DAMAGED-INOPERABLE)
PMW-3
PMW-4
MW-1
STORMWATER PIPE
FORMER OPERATIONAL AREA (PER 1995 RI REPORT)
MATERIAL STORAGE (BY OTHERS)
PMW-5
MHP-MW-3S
MHP-MW-3D
PMW-6
MHP-MW-4S
MH-102
MH-103S
MH-103D
MH-104
MH-105D
MH-105S
MH-101
FORMER NEPERA FACILITY

200' 0 200'
1"=200'

NOTE:

AERIAL IMAGE OBTAINED FROM NYS GIS CLEARINGHOUSE, DATED 2016.

LEGEND (APPROXIMATE LOCATIONS)

MW-##	EXISTING MONITORING WELLS
MH-##	NEPERA INVESTIGATION MONITORING WELLS
MHP-##	VILLAGE OF HARRIMAN MONITORING WELLS
PMW-#	PROPOSED MONITORING WELLS
	SHALLOW GROUNDWATER FLOW DIRECTION (1995 DATA)
	STORMWATER CHANNEL (UNDERGROUND)
	CLAY SEWER MAIN

Barton & Loguidice
11 Centre Park, Suite 203
Rochester, NY 14614

Date: JULY 2024
Scale: 1' = 200'
Figure Number: 1
Project Number: 1242.093.031

Plotted: Jul 25, 2024 - 10:10AM SYR By: bas
Z:\BL-Vault\ID2\18217AD2-1C71-4823-8927-99D5C4054147\0\3062000-3062999\3062684\LL\1242093 Monitoring Well Location Map (ID 3062684).dwg

Figure 2 - Anticipated Schedule - Site Characterization
Former Gaess Environmental Site
Village of Harriman, Orange County, New York

Events / Milestones	2024																							
	July		Aug				Sept				Oct					Nov				Dec				
	Wk 4	Wk 5	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4
Revised SC Work Plan Submission & Approval																							
Access Agreements Village/NS RR																							
Well Drilling																							
Well Sampling & Elevation Survey																							
Sample Analyses																							
Data Validation & Review																							
Report Preparation																							
Subcontractor Coordination																							

Blue Shaded denotes national holiday in work week - shipping and laboratory turnaround restrictions
Schedule subject to change based on access agreements and site conditions

Appendix A
Quality Assurance Project Plan

Quality Assurance Project Plan

Former Gaess Environmental Site
NYSDEC Site No. 336018

River Road
Harriman, New York

Prepared For

CWM CHEMICAL SERVICES, LLC

March 2024
Revised July 2024

Barton&Loguidice

Former Gaess Environmental Site
NYSDEC Site No. 336018

Quality Assurance Project Plan

March 2024
Revised July 2024

Prepared For:

CWM Chemical Services, LLC
600 New Ludlow Road
South Hadley, MA 01075

Prepared By:

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QAPP Attachments

QAPP Attachment A – Standard Operating Procedures
QAPP Attachment B – Portions of NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances, April 2023

1.0 Purpose

The purpose of this Quality Assurance Project Plan (QAPP) is to describe quality assurance and quality control (QA/QC) procedures that will be observed during completion of the activities described in the attached Site Characterization Work Plan (the Work Plan).

2.0 Quality Assurance Project Plan

This QAPP was prepared in accordance with New York State Department of Environmental Conservation (NYSDEC) DER-10 Section 2.4 and in Appendix A of NYSDEC's PFAS Sampling and Analysis guidance document.

2.1 Project Scope and Goals

A summary of the project objectives and a statement of how the activities described in this Site Characterization Work Plan relate to the overall site investigation or remediation strategy are presented in Section 3.0 of the Work Plan.

2.2 Project Organization

Barton & Loguidice, Inc.
Project Manager: Greg Lesniak, P.G.
Project Quality Assurance Officer: Jon Sundquist, Ph.D.
Field Staff: Don Howe, Rielly Fisher

Data Validator:
Don Anne, Alpha Geoscience

CWM Chemical Services, LLC:
Project Contact: Ryan Donovan

2.3 Sampling Procedures, Data Quality Usability Objectives and Equipment Decontamination Procedures

Drilling observation and sampling, monitoring well construction, and monitoring well development will be conducted as described in Section 3.2 of the Work Plan and in the associated Standard Operating Procedures (SOPs), provided in QAPP Attachment A.

Sampling will begin in areas where less contamination is anticipated and transition to more contaminated locations to reduce the potential for cross-contamination occurring.

All sources of water used for equipment decontamination or drilling will be verified in advance to be free of per- and polyflouoroalkyl substances (PFAS) through laboratory analysis or certification.

Soil sampling will be conducted in accordance with the applicable portions of Appendix B of the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances document dated April 2023. These portions are included as QAPP Attachment B.

Groundwater sampling and analysis will be conducted as described in Section 3.0 of the Work Plan. An SOP for groundwater sample collection is provided in QAPP Attachment A. Special precautionary sampling measures for PFAS sampling, pump and equipment types, decontamination procedures are summarized in Section 3.2 of the Work Plan and QAPP Attachment A. Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene.

The sampler shall wear nitrile gloves while conducting field work and handling sample containers. Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials shall be avoided. All clothing worn by sampling personnel shall have been laundered multiple times. Appropriate non-PFAS rain gear (PVC, polyurethane, or rubber rain gear are acceptable), non-PFAS bug spray, and sunscreen that does not contain PFAS are acceptable for use as necessary. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

2.4 Site Map Showing Sample Locations

A site plan depicting the locations of groundwater samples to be collected during this investigation is included as Figure 1 of the Site Characterization Work Plan.

2.5 Analytical Methods/Quality Assurance Summary

(1) Matrix type	Groundwater Samples
(2) Number or frequency of samples per matrix	7 samples plus QA/QC samples described below
(3) number of field and trip blanks per matrix	- 1 field blank per sample event (PFAS only) collected using laboratory provided PFAS free water - Equipment blanks will be submitted at a frequency of one equipment blank per day. A second equipment blank may be submitted on certain types of equipment (e.g., bladder pump) to evaluate the potential influence of components within the piece of equipment,
(4) Analytical parameters to be measured per matrix	PFAS and 1,4-Dioxane
(5) Analytical methods to be used per matrix with minimum reporting requirements	PFAS by EPA Method 1633 and 1,4-Dioxane by EPA Method 8270E SIM
(6) Number and type of matrix spike (MS) and matrix	One MS/MSD will be collected for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD

spike duplicate (MSD) samples to be collected	shall consist of an additional two samples at a given location and identified on the COC.
(7) Number and type of duplicate samples to be collected	One field duplicate will be collected per analyte at a frequency of one per twenty samples (1:20), with a minimum of one field duplicate per day of sample collection. The duplicate shall consist of an additional sample at a given location and be submitted to the laboratory as "blind".
(8) Sample preservation to be used per analytical method and sample matrix	- All samples are to be immediately placed in a cooler maintained at 4 ± 2°C using ice
(9) Sample container volume and type to be used per analytical method and sample matrix	- PFAS aqueous samples collected in 500 ml HDPE bottle - 1,4-Dioxane aqueous samples collected in two 500 ml amber glass bottles.
(10) Sample holding time to be used per analytical method and sample matrix	- PFAS by EPA Method 1633: 90 days - 1,4-Dioxane by EPA Method 8270E SIM: 7 days

QAPP Attachment A

Standard Operating Procedures

QAPP ATTACHMENT A

BARTON & LOGUIDICE, INC. – STANDARD OPERATING PROCEDURE (SOP)

SOP #1 - MONITORING WELL SAMPLING

1.0 Objectives

The purpose of this Standard Operating Procedure (SOP) is to define the procedural requirements for monitoring well sampling. This procedure is followed in order to collect groundwater samples from monitoring wells while exerting minimum stress on the water-bearing formation and minimizing the disturbance of sediment in the well. The "low-flow" purging and sample collection technique follows the technique described within the USEPA document entitled "EPA Ground Water Issue: Low-flow (Minimal Drawdown) Ground-water Sampling Procedures" (EPA/540/S-95/504, April 1996) and the USEPA Region II document entitled "Ground water Sampling Procedure Low Stress (Low Flow) Purging and Sampling" (March 16, 1998). The general approach is to minimize the drawdown in the well during purging, thereby reducing disturbance prior to and during sampling. Typically this is accomplished by limiting the flow rate during purging and sampling to rates in the 100 to 500 ml/min range. The intended advantage of this procedure is the reduction in the turbidity and aeration of the samples; thereby producing samples which are more representative of the natural groundwater conditions.

2.0 Scope and Applicability

The procedures of this SOP are applicable to personnel involved in the planning, coordination, preparation, conducting and reporting related to monitoring well sampling.

3.0 Required Materials

- Project plans (work plan/health and safety plan)
- Personal protective equipment as specified in the site-specific health and safety plan
- Bound field log book
- Water level probe
- Measuring tape
- Decontamination supplies (5 gallon buckets, decontamination fluids, distilled (DI) water)
- Peristaltic pumps may be used in very shallow wells for inorganic sample collection unless there is concern for the potential effects of some increase in the dissolved oxygen (D.O.) in the sample due to possible generation of "microbubbles" during

purging and sampling. Adjustable rate, positive displacement groundwater sampling pumps, such as a bladder pump or small diameter electric submersible pump (e.g., Grundfos Redi-Flo2 or equivalent), is preferred when increased levels of D.O. is a concern in the collected groundwater sample.

- The discharge tubing shall be Teflon®, Teflon® lined polyethylene, PVC, Tygon, or polyethylene, dedicated to each well. For organic analyses, the tubing shall be Teflon® or Teflon® lined polyethylene.
- The length and diameter of the discharge tubing shall be minimized (e.g., 1/4 or 3/8 inch ID) to ensure that the tubing remains filled with water during sampling.
- Monitoring equipment during purging shall include field measuring devices for pH, turbidity, specific conductance, temperature, oxidation-reduction potential (ORP), and/or D.O. D.O. and ORP meters must be installed in-line and have continuous readout capability during the sampling event.
- Flow-rate measurement supplies such as graduated cylinders and stopwatch.
- Well construction data.
- Geologic data such as the depth to higher permeable zones within the screened interval.
- Data from prior monitoring events (e.g., water level, pH, ORP, temperature, D.O.).
- Any additional equipment discussed in section 5.0

4.0 Responsibilities

The site manager is responsible for ensuring that field personnel employ methods in accordance with this procedure and any other applicable SOPs. The site manager must also ensure the monitoring well sampling procedures meet the requirements of the site specific plans.

The field team leader is responsible for ensuring that field personnel follow methods in accordance with this procedure and other relevant procedures.

Note: Responsibilities may vary from site to site. All field team member responsibilities shall be defined in the field plan or site/quality assurance project plan (QAPP).

5.0 Methods

5.1 Preliminary Site Activities

- Start at the well known or believed to have the least contaminated groundwater and proceed sequentially to the well with the most contaminated groundwater.

- Remove well cap and identify the pre-established elevation reference point on top of inside well casing. If not present, make one by cutting a small "V" notch in the casing with a utility knife.
- Measure and record the depth to groundwater (static water level) to within the nearest 0.01 foot from the reference point in all wells to be sampled prior to commencing purging. Take care to minimize disturbance to the water column and avoid dislodging particulates attached to the sides of the well casing.
- In no cases should the well be sounded prior to sampling as this may mobilize sediment in the bottom of the well.
- If dedicated equipment such as bladder pumps are not used, consideration should be given to placing the pump in the well 24 hours prior to sampling to allow any sediments in the well to settle.

5.2 Sampling Procedures

- Install Pump: Slowly lower the pump (or intake hose, if using a peristaltic pump) and downhole monitoring device, as applicable into the well to a depth corresponding to the center of the screened interval. If a zone of high permeability is present within the screened interval, consideration should be given to vertically centering the intake hose within this zone. This decision shall be made based on a review of site specific information. The intake shall be kept at least two feet above the bottom of the well to prevent mobilization of sediment from the bottom. If less than two feet of water is present in the well prior to sampling, the intake shall be centered in the water column. For problematic monitoring wells, consideration should be given to installing the pump approximately 24 hours before initiating purging. The approved site-specific Field Sampling Plan/Quality Assurance Project Plan (QAPP) shall be reviewed prior to the sampling event to determine the type of pump and other equipment to be used, as well as, the depth to which the pump intake shall be lowered in each well. Record the depth to which the pump is lowered.
- If the saturated water column within the screened interval is > 10 feet two samples will be collected from the well corresponding to the approximate center of the top half of the saturated water column and the approximate bottom half of the saturated water column. If a zone of high permeability is present within the saturated water column, consideration should be given to collecting one sample from the center of this zone. This decision shall be made based on a review of site specific information. The intake shall be kept at least two feet above the bottom of the well to prevent mobilization of sediment from the bottom. Record the depth to which the pump is lowered for each sample collected within the saturated water column.
- Re-Measure Groundwater Level: Before starting the pump, measure the water level again with the pump in the well. Do not proceed until the water level has returned to within approximately 0.3 feet of the static level.

- Purging: Start pumping the well at approximately 200 milliliters per minute. The water level shall be monitored as frequently as feasible immediately after the start of purging and then at least as frequent as every three to five minutes once the level has generally stabilized. Ideally, a steady flow rate shall be maintained which results in a stabilized water level. The goal should be to not induce a drawdown in excess of approximately 0.3 feet (or approximately 2 percent of saturated thickness in low permeability formations). Pumping rates shall, if needed, be reduced to the minimum capabilities of the pump to effect stabilization of the water level. However, care shall be taken to maintain pump suction and to avoid entrainment of air in the tubing. The water level in the well shall not drop below the top of the pump, therefore, pumping shall cease before this occurs. If the recharge rate of the well is very low, care shall be taken to avoid loss of pressure in the tubing line, cascading through the sand pack, or pumping the well dry. Record each adjustment made to the pumping rate, observation of changes in appearance of the water collected (e.g., increased turbidity or color) and the water level measured immediately after each adjustment.
- Monitor Indicator Parameters: During purging of the well, monitor the following field indicator parameters at the frequencies stated above; turbidity, temperature, specific conductance, pH, ORP and D.O. In line analyzers and continuous readout displays are recommended for all parameters so that the sample is not exposed to air prior to the measurement. However, if this is not feasible, temperature and/or ORP may be omitted from the list of in line parameters. Indicator parameters shall be measured approximately every 3 to 5 minutes. The well is considered stabilized and ready for sample collection when three consecutive readings are within a maximum range (from minimum to maximum measurements) as follows: +0.1 for pH, 3% for specific conductance, +10% for D.O., +10 mV for ORP, and +10% for turbidity. Measurement of the indicator parameters shall continue every three to five minutes until these measurements indicate stability in the water quality. If the parameters have not stabilized after about an hour, purge the well until a minimum of 3 well volumes have been removed and proceed to collect the samples. This alternate procedure should be noted on the field data sheet.
- Temperature and pH are commonly used as field indicator parameters; however, they are quite insensitive in distinguishing between formation water and stagnant casing water. These parameters are important parameters for data interpretation purposes, thus they shall be measured (Puls and Barcleona, 1996). Temperature readings at the flow cell may differ from the downhole probe values by 3 to 5ºC due to seasonal changes in air temperature (Barcelona et al, 1994).
- Collect Samples: Samples shall be collected at flow rates of between 100 and 250 ml/min, or under flow conditions such that drawdown of the water level within the well is not induced beyond the tolerances specified above. If VOCs are to be analyzed, they shall be collected first and discharged directly from the pump discharge tubing into pre preserved sample containers. Sample containers shall be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

- Remove Pump and Tubing: After collection of the samples, the pump's tubing, unless permanently installed, shall be properly discarded.
- Well Depth: Measure and record well depth.
- Close Down: Secure the well.

6.0 References

Barcelona, Michael J., H.A. Wehrmann, and M.D. Varljen, 1994. "Reproducible Well Purging Procedures and VOC Stabilization Criteria for Ground-Water Sampling." Ground Water. Vol. 32, No. 1, pp. 12-22.

Puls, R.W. and M.J. Barcelona, 1996, EPA Ground Water Issue Low-Flow (Minimal Drawdown) Ground-water Sampling Procedures, EPA/540/S-95/504.

United States Environmental Protection Agency – Region II, March 16, 1998, Ground water Sampling Procedure Low Stress (Low Flow) Purging and Sampling.

SOP # 1A - MONITORING WELL SAMPLING – PFAS

1.0 Objectives

The purpose of this Standard Operating Procedure (SOP) is to define the procedural requirements for the collection of groundwater samples from monitoring wells for laboratory analysis of polyfluoroalkyl substances (PFAS), such as perfluorooctanoic acid (PFOA-acid, Chemical Abstracts Service (CAS) No. 335-67-1), ammonium perfluorooctanoate (PFOA-salt, CAS No. 3825-26-1), perfluorooctane sulfonic acid (PFOS-acid, CAS No. 1763-23-1), and perfluorooctane sulfonate (PFOS-salt, CAS No. 2795-39-3). Due to the potential presence of PFAS in field sampling equipment, personal protective equipment (PPE), clothing, and many plastics, field sampling equipment and methodology for the collection of aqueous PFAS samples needs to include special provisions to eliminate the potential for sample contamination from PFAS containing materials.

2.0 Scope and Applicability

The procedures of this SOP are applicable to personnel involved in the planning, coordination, preparation, and sampling of PFAS in groundwater. This SOP is a supplement to the Monitoring Well Sampling SOP #1 and does not replace the equipment or methods specified unless where noted herein. Reporting limits required for PFAS are low (parts per trillion) and should be established as part of the quality assurance project plan (QAPP). The selected analytical laboratory shall have certification from the regulatory agency (e.g., New York State Department of Health (NYSDOH), or other federal/state agency) for analysis of PFAS with demonstrated proficiency using USEPA Method 1633 Modified, or method(s) required by the state regulatory agency, and any future modification to the approved analytical method.

3.0 Required Materials

- Materials and equipment as required per SOP #1 And project plans (work plan/health and safety plan)
- Personal protective equipment as specified in the site-specific health and safety plan and which does not contain potential PFAS materials as identified in Section 4.0

4.0 Potential PFAS Materials

The presence of PFAS in certain sampling equipment/containers, pumps, and PPE can result in sample contamination (i.e. false positive) if not avoided during sampling. Other materials, such as glass containers, may adsorb PFAS resulting in a loss of analyte from the sample prior to testing. The table below summarizes the items that should not be used and alternative/replacement items when sampling for PFAS.

Field Equipment/Pumps/Sample Containers/Materials	
Potential PFAS Containing/Interference	**Alternative/Replacement**
Teflon™ materials (PFTE)	HDPE and polypropylene
LDPE storage containers	Acetate liners
Teflon™ tubing, bailers, tape	Silicon, HDPE or LDPE, stainless steel
Sampling pumps with Teflon™ materials, passive diffusion bags	Peristaltic, Geotech SS Geosub, QED, Grundfos*
Plastic clipboards, binders or spiral hardcover notebooks	Aluminum field clipboards or with Masonite
Post-it Notes or Sharpies	Pens
Chemical (blue) ice packs	Regular ice
LDPE or glass containers	HDPE or polypropylene
Teflon™ lined sample container caps	Lined or unlined HDPE or polypropylene caps
Decon 90	Alconox@ and/or Liquinox@
PPE and Field Clothing	
Potential PFAS Containing	**Alternative/Replacement**
New clothing or water resistant, waterproof, or stain-treated clothing, or with Gore-Tex™	Well-laundered clothing (washed 6 times) made of synthetic or natural fibers (cotton preferred).
Clothing laundered with fabric softener	No fabric softener
Boots containing Gore-Tex™	Boots made with polyurethane and PVC
Tyvek	Cotton Clothing
Waterproof or resistant rain gear	Tent
Cosmetics, moisturizers, hand cream, or other related products	

For other products, equipment and materials, the Project Manager shall review the Safety Data Sheet (SDS)[B] or manufacturer's information to determine if it contains PFAS and shall not be used. Equipment with Viton Components need to be evaluated on a case by case basis, Viton contains PTFE, but may be acceptable if used in gaskets or O-rings that are sealed and will not come into contact with sample or sampling equipment.

5.0 Responsibilities

The Project Manager is responsible for ensuring that field personnel employ methods in accordance with this procedure and any other applicable SOPs. The Project Manager must also ensure the monitoring well sampling procedures for PFAS meet the requirements of the site specific plans.

The field team leader is responsible for ensuring that field personnel follow methods in accordance with this procedure and other relevant procedures.

Note: Responsibilities may vary from site to site. All field team member responsibilities shall be defined in the field sampling plan (FSP) or site/quality assurance project plan (QAPP).

6.0 Methods

Groundwater sampling from monitoring wells will follow sampling methodology as outlined in SOP #1, with modification to not use equipment/materials/products outlined in Table 1 and as specified below to avoid contamination from PFAS containing sources or cross-contamination during sampling. When also sampling for parameters other than PFAS, samples shall be collected for PFAS first as bottleware for other analytes may contain PFAS.

6.1 Field Equipment

- Do not use Teflon™ containing materials (e.g., Teflon® tubing, bailers, tape, plumbing paste, or other Teflon™ materials) since Teflon™ contains fluorinated compounds.

- High-density polyethylene (HDPE), low-density polyethylene (LDPE), and silicon materials are acceptable for sampling. Samples shall not be stored in containers made of LDPE materials.

- Where pumps are used for groundwater sample collection, use pumps with polyvinyl chloride (PVC) leads or other pumps for groundwater sample collection that are constructed with stainless steel and will minimize introductions of PFAS. Certain pumps such as bladder pumps, may also be used provided Teflon™ materials are a pump material/component or if testing by the manufacturer demonstrated that PFAS will not leach into groundwater. Submersible pumps (e.g.,Grundfos RediFlo pump or similar) may be used due to the pumping limitations of stainless steel pumps.

- When using liners to collect soil samples during direct-push technology or during conventional drilling and sampling methodologies, acetate liners are to be used.

- Pens will be used when documenting field activities in the field log and on field forms as well as labeling sample containers and preparing the Chain of Custody.

6.2 Field Clothing and Personal Protective Equipment

- Do not wear water resistant, waterproof, or stain-treated clothing during the field program. Field clothing made of synthetic and natural fibers (preferably cotton) are acceptable. New clothing may contain PFAS related treatments.

- Do not wear clothing or boots containing Gore-Tex™ during the sampling program as it contains a PFAS membrane.

- Safety footwear will consist of steel-toed boots made with polyurethane and PVC, untreated leather boots, or well-worn leather boots. Newer leather boots may be worn if they are covered with polypropylene, polyethane, or PVC boot covers.

- Disposable nitrile gloves must be worn at all times. A new pair of nitrile gloves shall be donned prior to the following activities at each sample location:
    - Decontamination of re-usable sampling equipment;
    - Prior to contact with sample bottles or water containers;
    - Insertion of anything into the well (e.g., HDPE tubing, HydraSleeve bailer, etc.) or pump;
    - Completion of monitor well purging, prior to sample collection;
    - Handling of any quality assurance/quality control samples including field blanks and equipment blanks; and,
    - After the handling of any non-dedicated sampling equipment, contact with non- decontaminated surfaces, or when judged necessary by field personnel.
- Field sampling occurring during wet weather (e.g., rainfall and snowfall) shall be conducted while wearing appropriate clothing that will not pose a risk for cross-contamination. Use rain gear made from polyurethane, vinyl, and wax or rubber-coated materials, and avoid synthetic gear that has been treated with water-repellant finishes containing PFAS.

- Teams shall consider the use of a gazebo tent, which can be erected overtop of the sample location and provide shelter from the rain. It should be noted that the canopy material is likely a treated surface and should be handled as such; therefore, gloves shall be worn when setting up and moving the tent, changed immediately afterwards and further contact with the tent should be avoided until all sampling activities have been finished and the team is ready to move on to the next sample location.

6.3 Sample Containers

- All samples shall be collected in laboratory supplied polypropylene or HDPE bottles. The USEPA Method 1633 includes a preservative. Different laboratories may supply sample collection containers of varying sizes. The screw cap will be made of polypropylene or HDPE and may be lined or unlined. However, if lined, the liner may not be made of Teflon® or contain PFAS.

- Do not allow the sample bottle cap to touch any surfaces during sampling. Avoid contact with the inside of the cap.

- Use a pen to fill out the sample container label after the caps have been placed back on each bottle.

- Glass sample containers are not to be used due to potential loss of analyte through adsorption.

6.4 Equipment Decontamination

- Field sampling equipment, including oil/water interface meters and water level indicators, and other downhole equipment used at each sample location, will require cleaning between uses. Alconox® and Liquinox® soap is acceptable for use since the Safety Data Sheets do not list fluoro-surfactants as an ingredient. However, Decon 90 will not be used during decontamination activities. Water used for the final rinse during decontamination of sampling equipment will be laboratory certified “PFAS-free” water.

6.5 Personnel Hygiene

- Cosmetics, moisturizers, hand cream, or other related products shall not be used prior to or during sampling. These products may contain surfactants and represent a potential source of PFAS.

- Many manufactured sunblock and insect repellants contain PFAS and shall not be used. Sunblock and insect repellants that are used on-site shall consist of 100% natural ingredients, unless manufacturer’s information is available to confirm they do not contain PFAS.

7.0 References

New York State Department of Environmental Conservation, April 2023. Sampling, Analysis, and Assessment of Per-and-Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs.

A number of additional sources were reviewed in developing this SOP including sampling guidelines from several laboratories certified in the analysis of PFAS, and publically available sampling procedures and methodologies implemented by government contractors at state and federal sites.

QAPP Attachment B

Portions of NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances, April 2023

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2° Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

Appendix B
Health and Safety Plan

Former Gaess Environmental Site
NYSDEC Site No. 336018

Health and Safety Plan

July 2024

Prepared For:

CWM Chemical Services, LLC
600 New Ludlow Road
South Hadley, MA 01075

Prepared By:

Barton & Loguidice, Inc.
11 Centre Park
Suite 203
Rochester, NY 14614

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1.0 General Information

1.1 Introduction

This Health and Safety Plan (HASP) was prepared by Barton & Loguidice, Inc., (B&L) for the CWM Chemical Services, LLC. (CWM) site to provide specific guidelines and establish procedures for the protection of personnel during future intrusive activities at the site where the existing soils will be penetrated. Groundwater at the site have documented PFAS impacts and soils may contain residual PFAS impacts from historic activities at the site or adjoining sites. The Plan is based on the site information available at this time, and anticipated conditions to be encountered during the different phases of work. This Plan is subject to modification as data are collected and evaluated.

All personnel conducting activities on-site must be in compliance with all applicable Federal and State rules and regulations regarding safe work practices. Personnel conducting field activities must also be familiar with the procedures, requirements and provisions of this Plan. In the event of conflicting Plans and requirements, personnel must implement those safety practices that afford the highest level of protection.

This HASP is not intended to be used by any subcontractors, but it may be used as the basis for contractors to prepare their own plans. This HASP may not address the specific health and safety needs or requirements of subcontractors and should be viewed as the minimum requirement.

2.0 Project Information

2.1 Comprehensive Work Plan

This HASP is appended to the Site Characterization Work Plan prepared by Barton & Loguidice, Inc., which describes the investigation activities for the site.

2.2 Scope of Work

Remedial and/or development activities at the site may entail drilling into the existing in-place soils at the site.

2.3 Organization Structure

Barton & Loguidice, Inc.:
Program Manager – Greg V. Lesniak, P.G.
Site Manager – Donald Howe

CWM Chemical Services, LLC:
Project Contact – Ryan Donovan

The Site Manager is responsible for the day-to-day activities of the project and for coordinating between office and field personnel. The Site Manager will oversee the remedial activities. The Barton & Loguidice on-site field personnel will serve as the Site Safety and Health Coordinator (SSHC). The SSHC will establish operating standards and coordinate overall project safety and health activities for the site. The SSHC will review project plans and revisions to determine that safety and health procedures are maintained throughout the project. Specifically the responsibilities of the SSHC include:

1. Aiding the selection of protective clothing and equipment.
2. Periodically inspecting protective clothing and equipment.
3. Maintaining proper storage of protective clothing and equipment.
4. Monitoring the workers for signs of heat stress, cold stress, and fatigue.
5. Monitoring on-site hazards and conditions.
6. Conducting periodic surveillance to evaluate effectiveness of the Site-specific Health and Safety Plan.
7. Having knowledge of emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.

8. Providing handouts to all on-site personnel that contain directions to the hospital and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.

9. Notifying, when necessary, local public emergency officials.

10. Coordinating emergency medical care.

The Site Manager will be responsible for ensuring that the field personnel are familiar with the contents of this plan and the roles of the SSHC.

3.0 Health and Safety Risk Analysis

Table E-1 breaks down the hazard types that may be encountered for the site activities.

Table E-1
Activity Hazard Evaluation

Activity	Hazard Type					
	Mechanical	**Electrical**	**Chemical**	**Physical**	**Biological**	**Temperature**
Drilling into PFAS Impacted Soils or Groundwater	Accidental injury from drilling equipment. Accidental injury from contact with drilling materials.	Overhead power lines.	Accidental inhalation, ingestions, skin absorption or eye contact with contaminants. Inhalation of equipment exhaust gases.	Puncture from buried objects/nails. Excessive noise. Fall hazards. Falling objects.	Rodents, Bees and wasps.	Heat stress and frost bite.

3.1 Physical Hazards

Physical hazards associated with the site are:

1. Slip, Trip, and Fall During All Activities (uneven terrain)

Construction sites may contain numerous potential safety hazards such as pits, broken glass, slippery surfaces and fire debris. The work itself may be a potential safety hazard. Site personnel should constantly look out for potential safety hazards and should immediately inform the SSHC of any new hazards.

2. Moving Parts of Heavy Equipment

Heavy equipment poses dangers though moving parts. Where feasible, access to moving parts will be guarded and equipment will be equipped with backup alarms.

3. Noise from Heavy Equipment

Work around large equipment often creates excess noise. Engineering controls and personal protective equipment will be used to protect employees' hearing.

4. Electrical Hazards

As in all site work, overhead power lines, buried power lines, electrical wires and cables, site electrical equipment, and lightning also pose a potential hazard to site workers. Site personnel should constantly look out for potential safety hazards and should immediately inform the SSHC of any new hazards.

5. Biological Hazards (insects, poison ivy, etc.)

Other biological hazards that may be present at the site include rodents and insects. PPE can reduce the potential for exposure. The SSHC can assist in determining the correct PPE for the hazard present.

3.2 Heat and Cold Stress

Workers will be routinely observed by the SSHC for symptoms of heat stress or cold exposure, as dictated by the weather conditions and work being conducted. Heat stress and cold exposure can be avoided by periodic, regular rest breaks.

Heat stress may be a potential hazard for personnel wearing PPE, particularly working in hot and humid conditions. Workers should take regular rest breaks within a shaded area, removing their PPE, and drink electrolyte replacing liquids and/or water. The SSHC is responsible for scheduling the amount of time each individual can work under the existing site conditions, and how often and how long they will break. Workers will be required to take their breaks in the clean zone after going through the decontamination area , or they may undergo partial decontamination and rest in a clean area within the decontamination area. Please refer to Section 7.2 (Site Control) of this HASP for a detailed description of the above referenced clean zone and decontamination area.

4.0 Medical Surveillance Program

4.1 General

Respirator protection and medical surveillance is not required for this site based on the known conditions and planned work. The remainder of this section is provided for reference purposes only.

OSHA in 29 CFR 1910.120, the Hazardous Waste Operations regulations and in 1910.134, the Respiratory Protection regulations, requires medical examinations. The examination may include the OSHA required Medical Questionnaire, Respirator Suitability Form, a Medical Examination, Audiology Test, Pulmonary Function Test, and testing for complete blood count and chemistry profile.

These medical examinations and procedures are performed by or under the supervision of a licensed physician. The medical monitoring is provided to workers free of cost, without loss of pay and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after an apparent over-exposure incident.

Employees who wear, or may wear, respiratory protection will be provided respirators as regulated by 29 CFR 1910.134 before performing designated duties. Prior to issuance of a respirator, a medical professional must have medically certified the individual's ability to wear respiratory protection. Where the medical requirements of 29 CFR 1910.120 overlap those of 29 CFR 1910.134, the more stringent of the two will be enforced. It is not anticipated the respirator use will be required at the site.

4.2 Frequency

1. Baseline Examinations

Individuals who are assigned temporarily or permanently to fieldwork at hazardous waste sites or the use of a respirator will receive a baseline examination prior to job assignment.

2. Periodic Examinations

Individuals who are assigned temporarily or permanently to fieldwork at hazardous waste sites or the use of a respirator will receive periodic examinations as required.

3. Termination Examinations

Field employees permanently leaving the company who were in the medical surveillance program will receive an exit examination.

4. Possible Exposure Examinations

As soon as possible upon notification by an employee that the employee has developed signs or

symptoms indicating possible overexposure to hazardous substances or health hazards, or that an employee has been injured or exposed above the permissible exposure limits in an emergency situation, that employee will be required to receive medical attention.

4.3 Examination Results

A letter must be received from the attending physician stating the parameters of the examination and whether or not the individual is able to work with or without restriction. This letter will be filed in the employee's file and a copy distributed to the employee. The examining physician makes a report to B&L of any medical condition that would place B&L employees at increased risk when wearing a respirator of other personal protective equipment. B&L maintains the medical records of personnel, as regulated by 29 CFR 1910.120 and 29 CFR 1910.1020, where applicable.

5.0 Training Program

5.1 Hazardous Waste Operations Health and Safety Training

Because this site is meets the definition of a hazardous waste site, employees who work during field activities are required to have completed HAZWOPER initial and refresher training.

Employees who are assigned to perform duties on hazardous waste sites will receive the OSHA initial 40-hour health and safety training prior to on-site activities, in accordance with 29 CFR 1910.120 (e). In addition, upon request, such personnel shall provide documentation of having received three (3) days of supervised field experience applicable to this site, or receive three (3) days of supervised field experience at this site. Only employees with current 40-hour HAZWOPER initial training and current 8-hour annual HAZWOPER refresher training certificates will be permitted to perform work at this site.

On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous waste operations work must obtain, in addition to the appropriate level of worker HAZWOPER training described above, eight (8) additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4). Current certificates must be provided for any applicable on-site managers and supervisors as described above.

5.2 Additional Training

As site activities change, supplemental training will be provided as-needed to employees to address changes in identified hazards, risks, operations procedures, emergency response, site control, and personal protective equipment. Specialty training will be provided as determined by task and responsibility.

Site-specific training will be provided to each employee and will be reviewed at safety briefings. Specialized training will be provided as dictated by the nature of site activities. Specialized training will be provided for activities such as the handling of unidentified substances. Employees involved in these types of activities will be given off-site instruction regarding the potential hazards involved with such activities and the appropriate health and safety procedures to be followed. Off-site instruction is meant to include any areas where employees will not be exposed to site hazards.

5.3 Other Potentially Applicable Training

Other training that may be required for workers, that is in addition to required training described above, is detailed below:

- Hazard communication, in accordance with 29 CFR 1910.1200
- Respirator use, in accordance with 29 CFR 1910.134
- Hearing conservation, in accordance with 29 CFR 1910.95

- Working safely around heavy equipment
- Heat and cold stress prevention
- Confined space entry, in accordance with 289 CFR 1910.146

5.4 Pre-Entry Briefing

A site-specific briefing will be provided to all individuals, including site visitors, who enter this site beyond the site entry point. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

The SSHC will brief personnel as to the potential hazards likely to be encountered. Topics will include:

- Availability of this HASP.
- General site hazards and specific hazards in the work areas, including those attributable to the chemicals present.
- Selection, use, testing and care of the body, eye, hand and foot protection being worn, with the limitations of each.
- Decontamination procedures for personnel, their personal protective equipment, and other equipment used on the site.
- Emergency response procedures and requirements.
- Emergency alarm systems (if applicable) and other forms of notification, and evacuation routes to be followed.
- Methods to obtain emergency assistance and medical attention.

5.5 Training Records

Written certification of the successful completion of applicable training requirements for each worker will be maintained and available upon request during the course of the site remedial and/or development activities. Offsite electronic records are acceptable assuming adequate internet access is available at the site to review such records remotely, otherwise copies of records shall be maintained at the site. Written certificates have been given to each person so certified. Additionally, each worker shall review a copy of this HASP and understands its contents prior to commencing work at the site.

6.0 Health and Safety Field Implementation

6.1 Personal Protective Equipment Requirements

Table E-2
Personal Protective Equipment (PPE) Requirements

Job Tasks	Level of Protection	PPE						
		Suit	Gloves	Feet	Head	Eyes	Ears	Respirator
All on-site	Modified D	Std.	Neoprene or Nitrile	Steel toe + Booties	HH	Glasses/ Goggles	Plugs/ Muffs	N/A
Elevated PID Readings	C	PE Tyvek	Neoprene or Nitrile	Steel toe + Booties	HH	N/A	Plugs/ Muffs	Full APR w/OV & N100

Personal Protective Equipment

SUIT:
Std = Standard Work Clothes
PE Tyvek = Polyethylene-coated Tyvek

FEET:
Steel = Steel-toe Boots
Booties = PVC or Latex Booties

HEAD:
HH = Hard Hat

EYE:
Glasses = Safety Glasses w/side shields

Goggles = Safety Goggles

Personal Protective Equipment

EAR:
Plugs = Ear Plugs
Muffs = Ear Muffs

RESPIRATOR:
R: = Air-purifying respirator
APR = Full-face APR
Full APR = Organic vapor cartridge
OV = N100 particulate filters
N100

The requirements for personal protective equipment (PPE) are outlined in table E-2. Level D protection will initially be worn for drilling activities. Level C protection may be used, based upon a sustained (five (5) minutes or more) readings above five (5) parts per million (ppm) measured with the photoionization detector (PID). The emissions from gasoline or diesel-powered drilling equipment may affect PID readings. At the start of work (drilling equipment in operation, but prior to exposing contaminated soils), an ambient PID reading will be established. This ambient PID reading will be subtracted from subsequent readings to evaluate PPE usage.

6.2 Community Air Monitoring Plan

The Site Manager or designee will perform air monitoring in accordance with the New York State Department of Health (NYSDOH) Community Air Monitoring Plan. Direct reading instruments will be calibrated in accordance with manufacturer's requirements and the results of the calibration will be documented.

This Community Air Monitoring Plan (CAMP) sets forth the procedures for performing real-time monitoring for particulates (i.e., dust) at the downwind perimeter of each designated work area with respect to specific activities to be completed. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses, and on-site or nearby workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of remedial and/or development activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Continuous monitoring will be required for all subsurface intrusive activities**.** The various field instruments that will be used by on-site personnel to perform the continuous air monitoring are listed in Table E-3 below. Subsurface intrusive activities include, but are not limited to, drilling and soil handling.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone or work area. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and available for State (NYSDEC and NYSDOH) personnel to review.

Table E-3
Monitoring Protocols and Contaminant Action Levels

Contaminant/ Atmospheric Condition	Monitoring Equipment	Monitoring Protocol	Breathing Zone* Action Level Concentrations	
			Monitored Level For Mandatory Respirator Use**	Monitored Level For Mandatory Work Stoppages***
Particulates	MiniRam or Dusttrak or Equivalent	Continuously during intrusive activities that can generate dust.	Dust suppression techniques required at 100 ppm above background	150 ug/m3 at fence line (institute engineering controls to control dust) per NYSDEC TAGM 4031

* Monitoring performed in the breathing zone for sustained readings of 5 minutes or more. Monitor source first; if the source is near or above the action level concentration, monitor in the breathing zone.
** Monitored levels will require the use of approved respiratory protection.
*** Consult the Site manager.

6.3 Decontamination Procedures

Depending on the specific job task, decontamination may include personnel themselves, tools, and/or heavy equipment. The specified level of protection for a task (A, B, C, or D) does not itself define the extent of personal protection or equipment decontamination. For instance, Level C without dermal hazards will require less decontamination than Level C with dermal hazards. Heavy equipment will always require decontamination to prevent cross-contamination. The following sections summarize general decontamination (a.k.a. decon) protocols.

6.3.1 Heavy Equipment

Heavy equipment, drilling rods, augers and/or buckets will be steam cleaned after use at the designated decontamination area. In addition, containment systems will be set-up at the designated decontamination area for collection of decon fluids and materials.

6.3.2 Decontamination Wastes and Investigation Derived Wastes

Decontamination wash and rinse waters and investigation derived wastes (IDW) will be managed according to applicable regulatory guidelines.

- Spent decon solutions may be required to be drummed and disposed of as hazardous waste and/or solvent solutions may be required to be segregated from water rinses.

- Decontamination shall be performed in a manner that minimizes the amount of waste generated.
- IDW may be required to be drummed and disposed of as hazardous waste.

7.0 Site Operating Procedures

These following guidelines comply with the established guidelines of the Barton & Loguidice, Inc., Corporate Health and Safety Program:

All site remedial and/or development activities must be coordinated through the Site Manager. During any activity conducted on-site in which a potential exists for exposure to hazardous materials, accident or injury, at least two (2) persons must be present who are in constant communication with each other. At least two (2) persons must also be present during all drilling activities.

Samples obtained from areas known or suspected to contain contaminated substances or materials must be handled with appropriate personal protection equipment.

All equipment used to conduct site remedial and/or development activities must be properly decontaminated and maintained in good working order. Equipment must be inspected for signs of defects and/or contamination before and after each use.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated will result in the evacuation of the activity zone until a complete evaluation of the hazard can be performed.

7.1 Daily Operating Procedures

The following are the daily operating procedures that are to be followed by on-site personnel:

- Hold Tailgate Safety Meetings prior to work start and as needed thereafter (suggest daily; however, minimum of weekly).
- Use monitoring instruments and follow designated protocol and contaminant action levels.
- Use PPE as specified.
- Use hearing protection around heavy equipment.
- Remain upwind of operations and airborne contaminants, if possible.
- Establish a work/rest regimen when ambient temperatures and protective clothing create potential thermal hazards.
- Eating, drinking, applying cosmetics and smoking are prohibited in work areas.
- Refer to the SSHC for specific safety concerns for each individual site task.
- On-site personnel are encouraged to be alert to their own physical condition, as well as their co-workers.

- **All accidents, no matter how minor,** must be immediately reported to the SSHC.

7.2 Site Control

The purpose of site control is to minimize the exposure of site workers to potential contamination, protect the public from the site's hazards, and prevent vandalism. The degree of site control necessary depends on site characteristics and the surrounding community. At this time, there are no access restrictions to the site. During the field activities, Barton & Loguidice, Inc. (B&L), and the CWM Chemical Services, LLC (CWM) are requesting that personnel, subcontractors and visitors report to the on-site B&L supervisor prior to entering the work area.

Since there are no access restrictions to the Site, particular attention will be placed on the condition of the site regarding three (3) main work zone areas. Based on the nature of the work, one or more of the three work zones may be combined and there will be no designations between work zones. The three main work zone types typically utilized are described below:

Activity Zone

This zone applies to the immediate work area and includes all materials, equipment, vehicles and personnel involved in the site activity. Site control measures will include clearly marking the limits of work and to warn passers-by and visitors of the site activity. In addition, the site supervisor will maintain communication with B&L and CWM personnel as the location of this zone (and the type of work being performed) changes throughout the project.

The required level of PPE in the activity zone can vary according to job assignment. This will allow a flexible, effective, and less costly operation, while still maintaining a high degree of safety.

This area will be limited to authorized personnel from B&L, regulatory agencies, and contractors/subcontractors to the B&L and/or CWM. Personnel entering this area will be required to comply with their own HASP that is at least as stringent as this HASP.

Decontamination Zone

In order to prevent incidental contact with contaminants on equipment or in the wash water, activities within the decontamination area will be completed before subsequent site work or other activity begins. This includes:

- Complete removal of contaminants on all equipment used during the site remedial and/or development activities;
- Placement of the waste wash water and sediment in sealed drums;
- Storage of the drums in a secure and out-of-the-way place for future disposal;
- Proper labeling of drum contents;

- Cleanup (if necessary) of area outside of decontamination area; and

Support Zone

The support zone is the location of the administrative and other support functions needed to keep the operations in the activity and decontamination zone running smoothly. Any function that need not or cannot be performed in a hazardous atmosphere is performed here. Personnel may wear normal work clothes within this zone. Any potentially contaminated clothing, equipment and samples must remain in the decontamination zone until decontaminated. All emergency telephone numbers, evacuation route maps, and vehicle keys shall be kept in the support zone.

The SSHC will establish a decontamination system and decontamination procedures appropriate to the site and the work that will prevent potentially hazardous materials from leaving the site. The decontamination procedures will be reviewed at each daily safety briefing.

Personal hygiene facilities meeting at least the minimum requirements of 29 CFR Part 1910.120 will be provided nearby.

Upon completion of the day's activities, heavy machinery and equipment will be stored securely within the site, or at a location selected by the SSHC.

8.0 Emergency Response Procedures

8.1 Pre-Emergency Planning

Planning for emergencies is a crucial part of emergency response. The SSHC is responsible for training all employees in potential site hazards and the emergency response procedures.

8.2 Personnel Roles

The SSHC is responsible for responding to, or coordinating the response of, off-site personnel to emergencies. In the event of an emergency, the SSHC will direct all notification, response and follow-up actions. Contacts with outside response personnel (hospital, fire department, etc.) will be done at the direction of the SSHC.

Prior to the start of work on the site, the SSHC will:

1. Confirm that the following safety equipment is available: first aid supplies (provided in B&L Fleet Vehicles), and fire extinguisher (when drill rig is on site);
2. Have a working knowledge of the safety equipment available; and,
3. Confirm directions to the hospital are prominently posted, or readily available if no job trailer, with the emergency telephone numbers.

The SSHC will check daily to see that the above safety equipment is available at the site.

Employees who will respond to emergencies involving hazardous materials will be trained in how to respond to such emergencies.

The SSHC will be responsible for directing notification, response and follow-up actions and for contacting outside emergency response personnel (ambulance, fire department, or others) during an emergency. Upon notification of an exposure incident, the SSHC will call the hospital and fire and police emergency response personnel for recommended medical diagnosis, treatment, and if necessary, transportation to the hospital.

The SSHC must conduct an investigation of the incident as soon as possible. The SSHC will determine whether, and at what levels, exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring. The resulting report must be accurate, objective, complete and signed and dated.

8.3 Safe Distances and Places of Refuge

In case of an emergency, a designated area (may be onsite or offsite, depending on the site conditions and shall be determined at the onset of the project) will serve as the immediate place of refuge. For this project, the place of refuge shall be the property site entrance. Personnel in the exclusion zone should evacuate through the decontamination zone to the refuge location, both for their own personal safety and to prevent hampering response/rescue efforts. Following an evacuation, the SSHC will account for on-site personnel. If evacuation from the work site is necessary, the project vehicles will be used to transport on-site personnel to the place of refuge.

8.4 Emergency Communications

There will be a cellular telephone located with the Site Manager and/or SSHC for emergency use. Emergency telephone numbers are listed in Attachment 1 of this HASP. Depending on the project and site conditions, additional emergency signals such as air horns, walkie-talkies, and/or other audible emergency signals may be required which will be located within the exclusion zone and decontamination area to signal others of an emergency. The SSHC should brief all personnel regarding audible emergency signals to be used during the site activities prior to starting the work. Site personnel will use the following hand signals to inform others of emergencies:

- Hand gripping throat - out of air, cannot breathe.
- Grip partner's wrist or both hands around waist - leave area immediately.
- Hands on top of head - need assistance.
- Thumbs up - everything's OK, or I understand.
- Thumbs down – No.

8.5 Emergency Procedures

The nature of work at a contaminated, or potentially contaminated, work site makes emergencies a continual possibility. Although emergencies are occur infrequently, a contingency plan is required to assure timely and appropriate response actions. The contingency plan is reviewed at tailgate safety meetings.

8.5.1 Incident Procedures

If an emergency incident occurs, the following actions will be taken:

1. Size-up the situation based upon available information.
2. Notify the SSHC.
3. Only respond to an emergency if personnel are sufficiently trained and properly equipped.

4. As appropriate, evacuate site personnel and notify emergency response agencies, e.g., police, fire, etc.
5. As necessary, request assistance from outside sources and/or allocate personnel and equipment resources for the response.
6. Consult the emergency telephone list and contact key project personnel.
7. Following the emergency event and response, prepare an incident report.

All site personnel shall be aware of the location of firefighting equipment when fire risk is applicable to the site (i.e. when drill rig is on site). Personnel shall only extinguish minor fires. Large fires will require contacting the local fire department and allowing them to handle the fire. The local fire department will be contacted prior to initiating site activities to inform them of the potential hazardous materials that could be encountered in an emergency.

8.5.2 Medical Emergencies

In the event of an accident or injury, workers will immediately implement emergency decontamination and isolation measures as necessary to assist those who have been injured or exposed and to protect others from the hazards. Upon notification of an exposure incident, the SSHC will contact the emergency response personnel who can provide medical diagnosis and treatment. If necessary, immediate medical care will be provided by trained personnel competent in first aid procedures. Trained personnel competent in such matters will only provide other on-site medical and/or first aid response to an injury or illness.

8.6 Emergency Routes

Upon notification of an emergency, on-site personnel shall immediately stop what they are doing, and should evacuate through the decontamination area. Personnel in the decontamination area and the support zone shall evaluate the emergency and contact the appropriate off site emergency personnel. Once on site personnel return to the decontamination area, the SSHC or designee will direct them as to what to do. It is imperative that the SSHC, or designated alternate, account for all site personnel. The SSHC will direct all personnel to the nearest safe refuge.

The closest Urgent Care Facility and Rambam Urgent Care in Kiryas Joel, NY. The closest hospital to the site is St. Anthony Community Hospital in Warwick, NY. **Both the Urgent Care and Hospital directions and route maps are included as Attachment 2.**

If the emergency event threatens the surrounding community, it is important that the local police and fire departments be contacted immediately regarding the potential danger.

8.7 Spill Control

A major spill is not anticipated at the site. Should a spill of any type occur, the identifying employee shall report it immediately to the SSHC, who will make arrangements for the proper cleanup of the spill. These arrangements will include diking and ditching, as necessary, as well as the use of absorbents such as vermiculite or Speedi Dry. The emergency response personnel will be contacted immediately by SSHC in the event that on-site materials can not immediately contain the spill.

8.8 Personal Protective and Emergency Equipment

There will be suitable equipment on site for small emergency events such as additional PPE and first aid kits, and fire extinguishers (when fire risk exists while drill rig is on site). In the event of a major emergency event, off-site personnel will be contacted immediately.

8.9 Evacuation Routes

Unless otherwise directed, evacuation will be made through the decontamination area to the designated refuge location for a head count.

8.10 Response Critique

Should an incident on-site occur, the SSHC will analyze the response efforts in order to continually improve on-site conditions and procedures. The SSHC must complete follow-up activities before on-site work is resumed following an emergency. Used emergency equipment must be recharged, refilled or replaced. Government agencies must be notified as required in their regulations.

ATTACHMENT 1

EMERGENCY CONTACTS
(To be readily available onsite and/or posted)

Contact	**Person or Agency**	**Phone Number**
Harriman Engine Company Station 2	Fire Department	911 (845) 395-9641
NYSDEC Project Manager	Parag Amin, P.E.	(518) 402-9662
Law Enforcement	Harriman Police Department	911 (845) 395-9641
Confined Space Rescue (Fire Department)	Fire Department	911 (845) 395-9641
Ambulance	Fire Department	911 (845) 395-9641
Hospital - Emergency	St. Anthony Community Hospital	(845) 986-2276
Urgent Care	Rambam Urgent Care	(845)783-1234
B&L Project Manager	Greg Lesniak, P.G.	Office: (315) 457-5200 Cell: (585)727-1775
B&L Site Manager/Site Safety Officer	Don Howe	(315) 269-9910
B&L Officer-in-Charge/Program Manager	David R. Hanny, CPESC, CPSWQ, LEED AP	(585) 325-7190

ATTACHMENT 2

Rambam Urgent Care Route

From: River Road, Harriman, NY

To: Rambam Urgent Care, 1 Strelisk Ct, Kiryas Joel, NY 10950

1.	Head **west** on **River Road** toward **N. Main Street**	0.2 miles
2.	Turn **right** at **N. Main Street**	0.4 miles
3.	Turn **right** at **Highway 17M**	1.7 miles
4.	Turn **right** onto **Stage Road**	469 feet
5.	Turn **right** at **Maple Ave**	0.1 miles
6.	Turn **left** at **Carpenter Place**	295 feet
7.	Turn **right** at **Mapes Place**	0.1 miles
8.	Turn **left** at **Spring Street**	0.1 miles
9.	Turn **right** at **Franklin Ave**	0.4 miles
11.	Turn **right** at **Forest Ave**	0.5 miles
12.	Turn **right** at **Forest Road**	0.2 miles
13.	Arrive at Rambam Urgent Care on the **left**	39 feet

Hospital Route

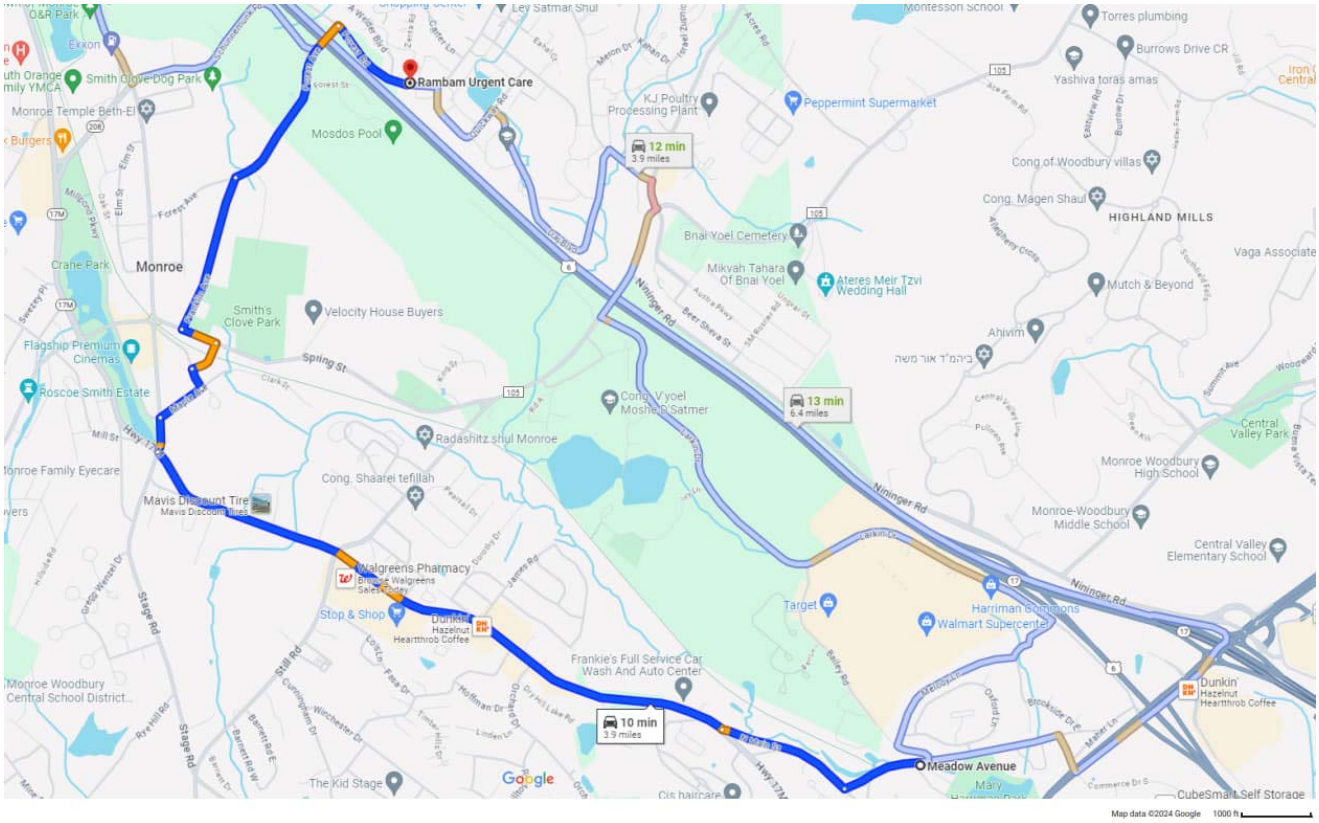
From: River Road, Harriman, NY

To: St. Anthony Community Hospital, 15 Maple Avenue, Warwick, NY 10990

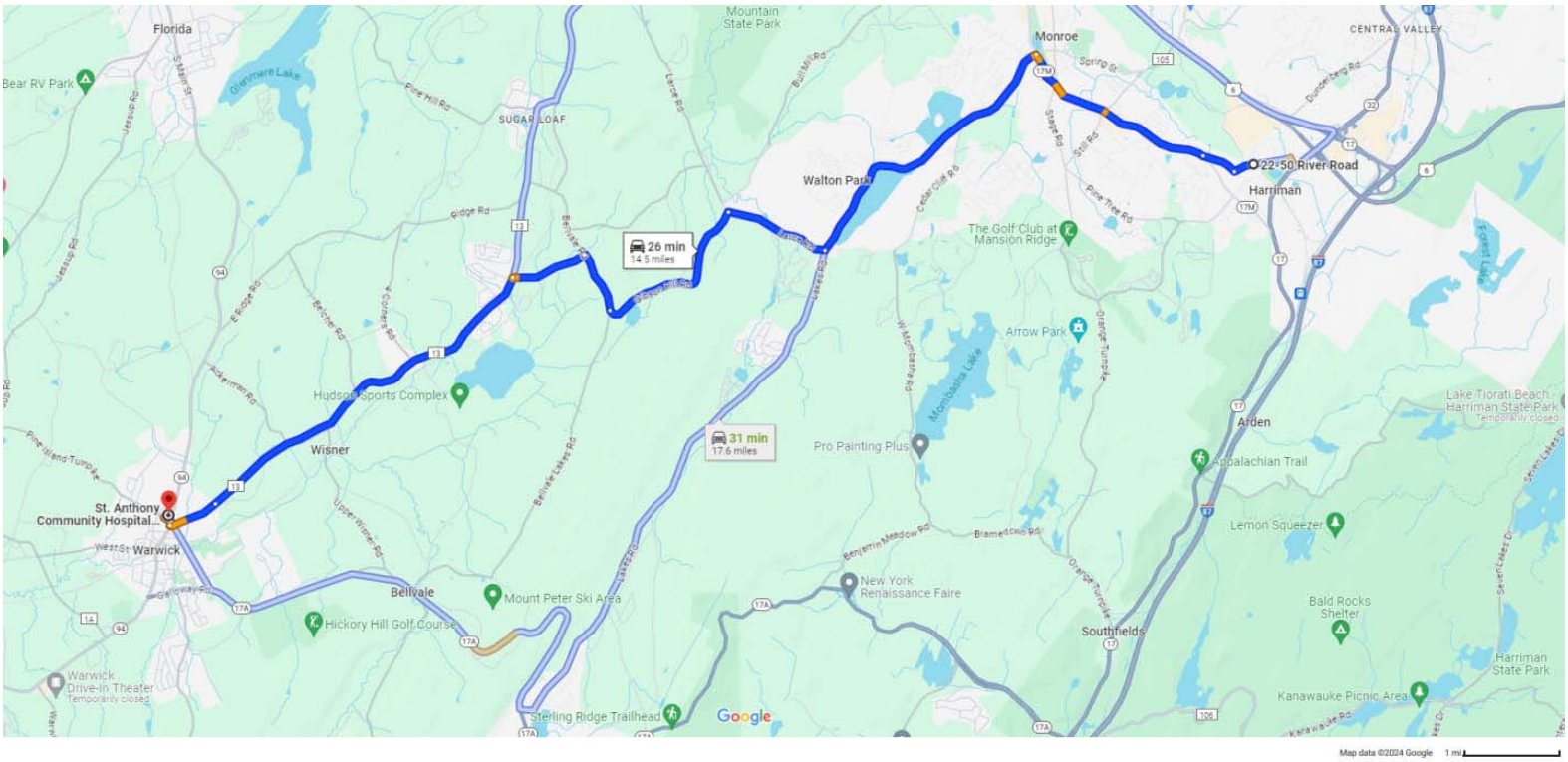
1.	Head **west** on **River Road** toward **N. Main Street**	0.2 miles
2.	Turn **right** at **N. Main Street**	0.4 miles
3.	Turn **right** at **Highway 17M**	2.1 miles
4.	Turn **left** at **Lakes Road/Co Rd 5**	3.1 miles
5.	Turn **right** at **Laroe Road/Co Rd 45**	1.1 miles
6.	Turn **left** at **Gibson Hill Road/Co Rd 82**	1.8 miles
7.	Continue **straight** at **Bellvale Road/Co Rd 82**	0.6 miles
8.	Turn **left** at **Lake Station Road**	0.8 miles
9.	Turn **left** at **Kings Highway/Co Rd 13**	3.9 miles
10.	Continue **straight** at **Colonial Ave**	0.5 miles
11.	Turn **right** at **Maple Ave**	236 feet
12.	Turn **left** at **Grand Street**	397 feet
13.	Arrive at St. Anthony Community Hospital on the **right**	82 feet

(Emergency routes and maps shall be readily available at the site, and if a job trailer is provided, shall be posted conspicuous in the job trailer.)

Urgent Care Route Map



Hospital Route Map



The experience to
listen
The power to
solve℠

Barton & Loguidice

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